

RADY 401 Case Presentation

Hypersensitivity Pneumonitis

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9/13/21

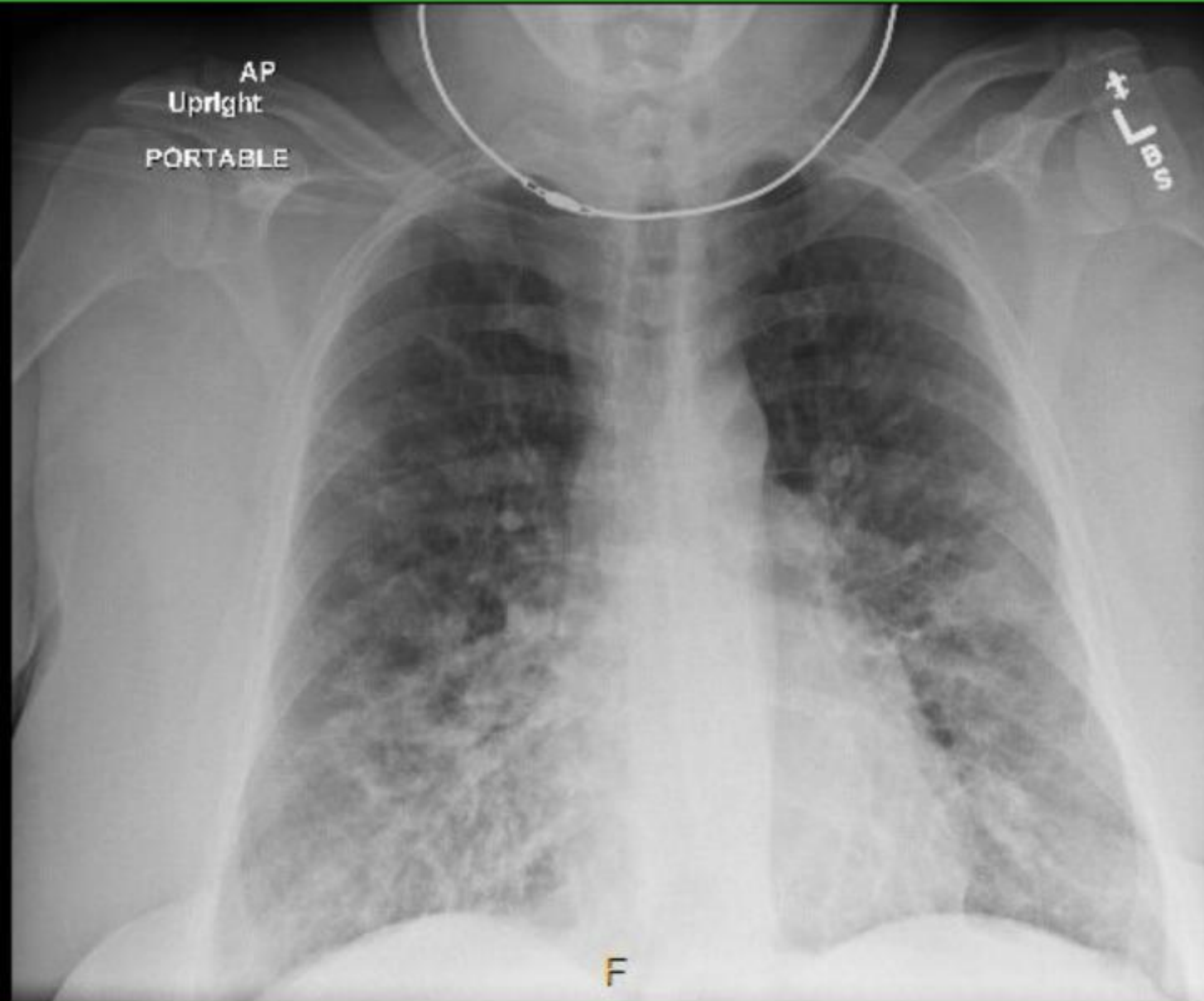
Patient history and workup

- 51 y.o. female with PMH of OSA, opioid use disorder presented to UNC ED with 5-day history of fever, productive cough, SOB, headache, myalgias. Home O2 sat was 80-82%.
- No recent illness. COVID-19 negative. Recent travel out-of-state to family's farm. 15 pack-year smoking history.
- Physical Exam: **Temp 38.1, HR 101, BP 135/53, Resp 20, O2 93% on 3L. Rhonchi bilaterally**, worse in lung bases, no wheezing. Otherwise unremarkable
- Notable Labs/Studies: **WBC 17.8**. VBG wnl

List of imaging studies HD 1

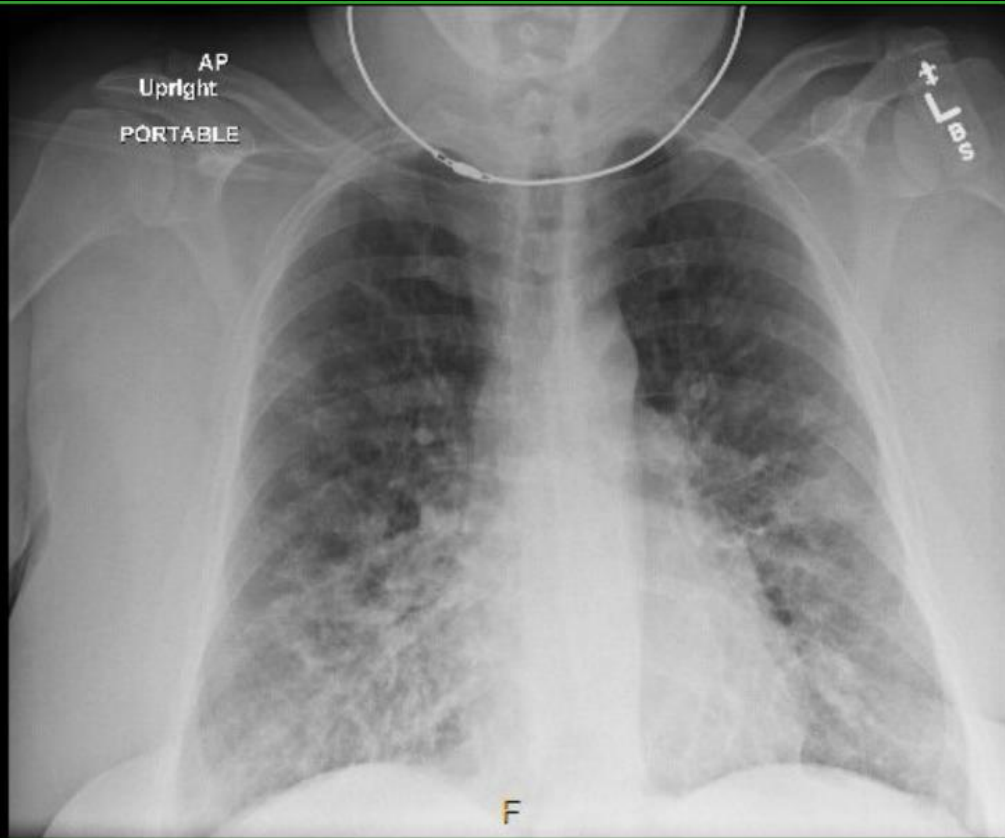
- Chest X-ray
 - Estimated cost: \$130 - \$280¹
 - Radiation 0.1 mSv

Imaging studies from PACS

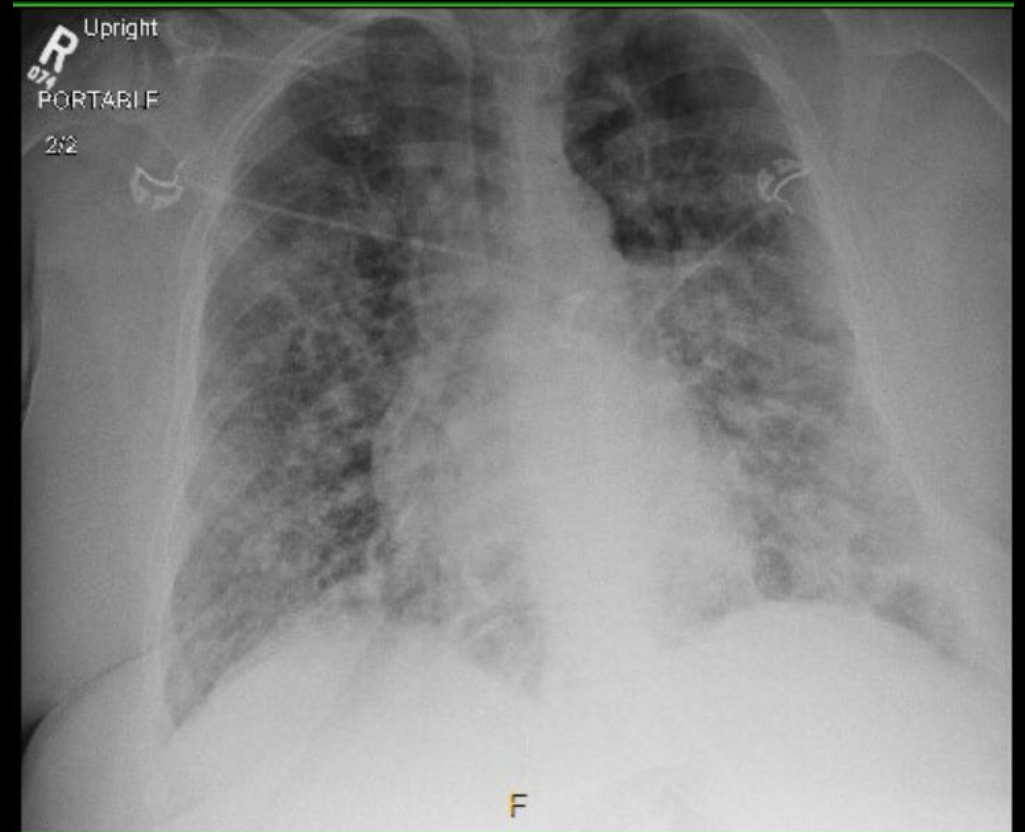
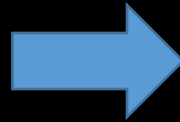


Patchy and multifocal bilateral lung opacities primarily involving the bilateral mid and lower lung zones

Imaging studies from PACS



DAY 1



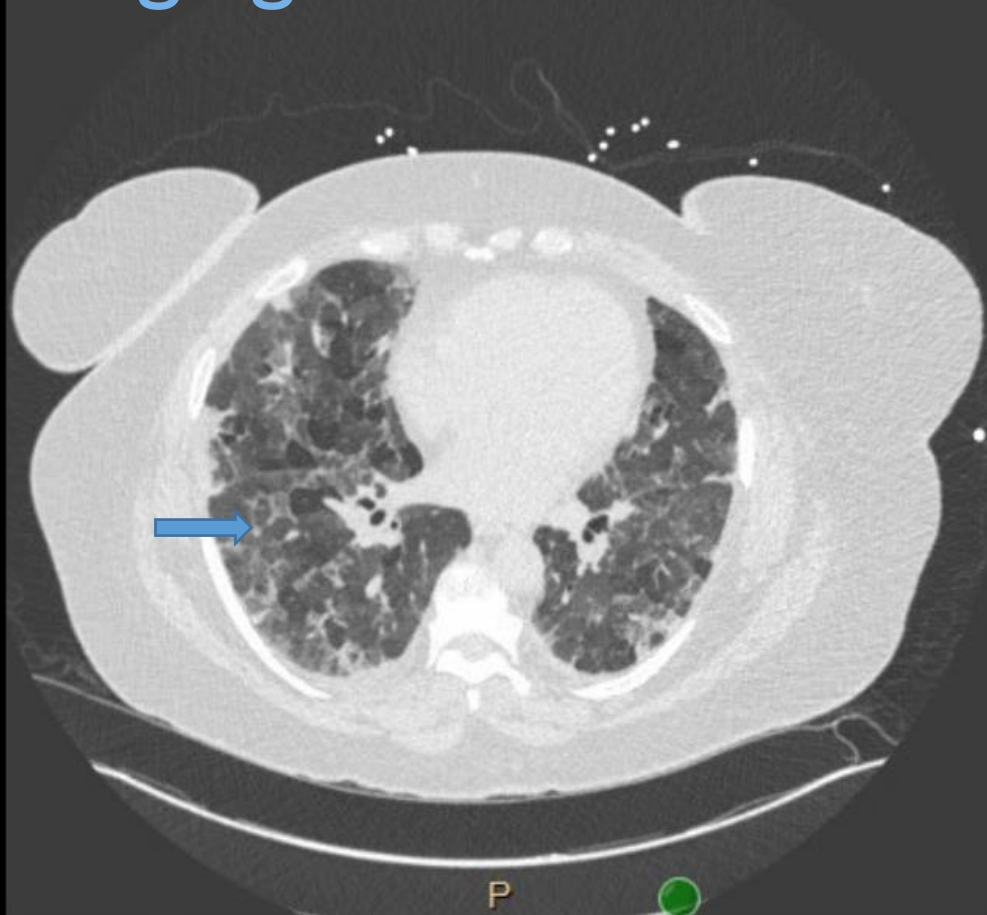
DAY 2

Patient developed worsening SOB and fever overnight, transferred to ICU and placed on BIPAP.

List of imaging studies HD 2

- High-Resolution CT Chest
 - Estimated cost: \$470 - 3700²
 - Radiation 6.1 mSv

Imaging studies from PACS



INS



EXP

Architectural distortion, mosaic lung parenchymal attenuation and patchy ground-glass opacities.

Imaging studies from PACS 4

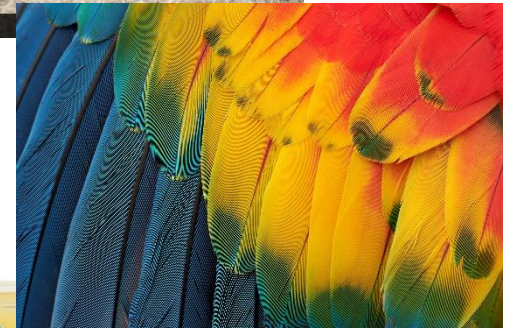
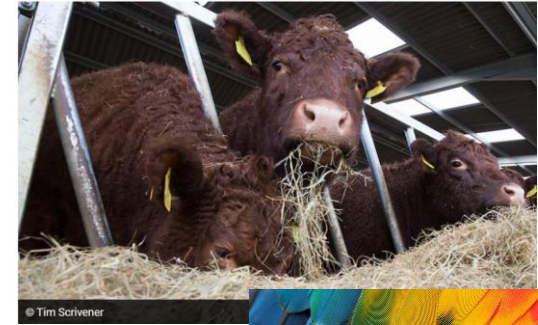


Patient treatment/outcome

- Acute hypersensitivity pneumonitis was favored as likely etiology based on high resolution CT showing diffuse mosaicism and air trapping, with multiple potential exposures including goats, parakeets, and potential mold exposure from recent work with air conditioner/ducts
- Started 250mg of methylprednisone on day 2 of admission with showed a marked improvement in her oxygen requirement. Weaned gradually from BIPAP to HFNC to room air. She was then transitioned to prednisone taper
- Discharged with follow-up with outpatient pulmonology

Hypersensitivity Pneumonitis

- Definition: Diffuse parenchymal lung disease caused by inhalation of and sensitization to inhaled antigens
 - Common antigens : bacteria, fungi/yeast, animal proteins, synthetic material (polyurethane, paints, dyes).³
 - Classified into acute, chronic non-fibrotic and chronic fibrotic forms.³
- Clinical presentation:
 - Dyspnea and cough most common. Constitutional symptoms, (fever, chills, weight loss, and malaise) can also occur
 - Symptoms may present acutely (days to weeks), insidiously (months to years), or as recurrent episodes.³



Hypersensitivity Pneumonitis

- Diagnosis:
 - Evidence of exposure to a provocative antigen based on history, clinical presentation, serum specific IgG
 - HRCT scan showing "classic" features (eg, small centrilobular nodules, ground-glass attenuation, and lobular areas of decreased attenuation and vascularity) ³
- Treatment:
 - Antigen avoidance
 - symptomatic acute or subacute HP: course of oral glucocorticoids
 - Future directions: other immunosuppressive agents (azathioprine and mycophenolate), monoclonal antibodies ³

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ACR Appropriateness Criteria

Variant 2: Occupational exposure, suspected interstitial lung disease. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
CT chest without IV contrast	Usually Appropriate	⊕⊕⊕
Radiography chest	Usually Appropriate	⊕
CT chest with IV contrast	Usually Not Appropriate	⊕⊕⊕
CT chest without and with IV contrast	Usually Not Appropriate	⊕⊕⊕
MRI chest without and with IV contrast	Usually Not Appropriate	○
MRI chest without IV contrast	Usually Not Appropriate	○
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	⊕⊕⊕⊕

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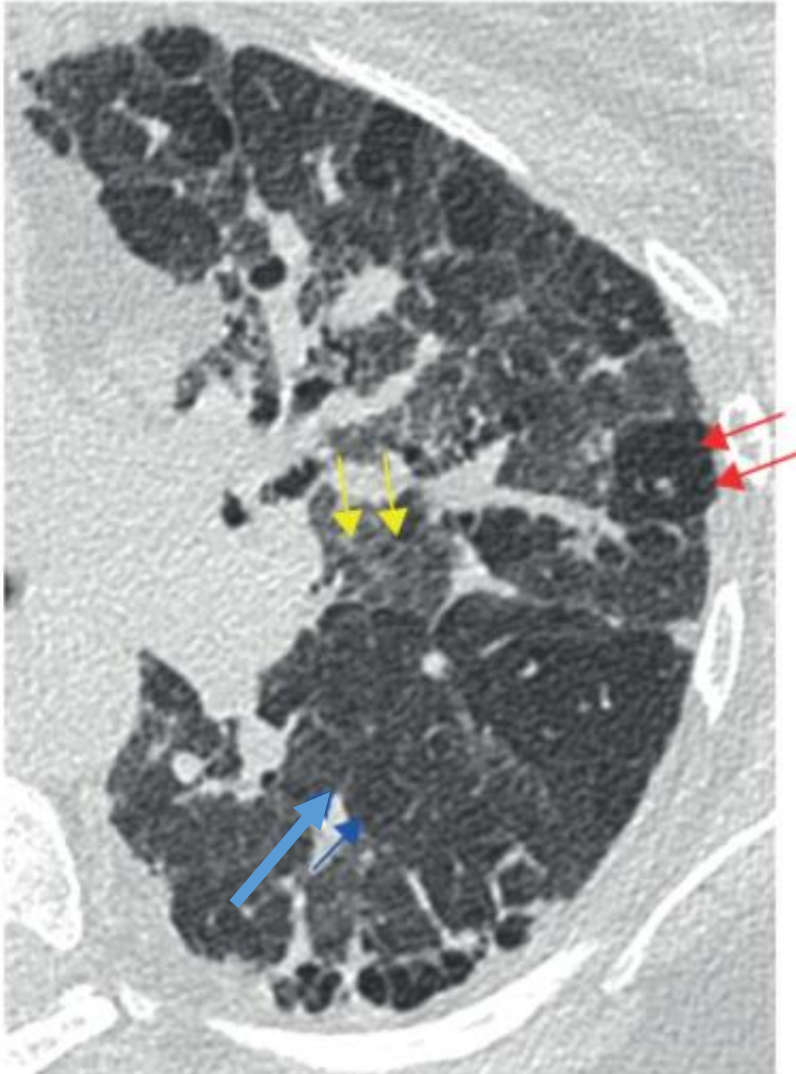
Relative Radiation Level Designation	
Relative Radiation Level*	Adult Effective Dose Estimate Range
○	0 mSv
⊕	<0.1 mSv
⊕⊕	0.1-1 mSv
⊕⊕⊕	1-10 mSv
⊕⊕⊕⊕	10-30 mSv
⊕⊕⊕⊕⊕	30-100 mSv

*RRL assignments for some of the examinations cannot be made, because the dose varies as a function of a number of factors (eg, region of the body exposed to ionizing radiation). The RRLs for these examinations are designated as "Varies."

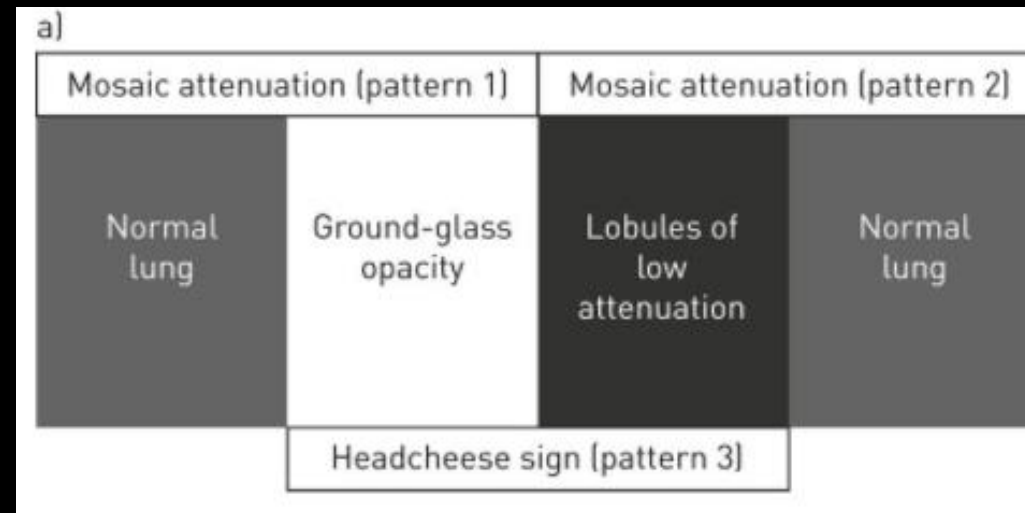
High Resolution Computerized Tomography (HRCT)

Acute HP and chronic non-fibrotic HP	Chronic fibrotic HP
Features	
Ground-glass opacities	Reticular opacities, traction bronchiectasis and honeycombing
Centrilobular nodules of ground-glass attenuation that are small and poorly defined	Superimposed with findings of acute HP (for example, combination of ground-glass opacities, centrilobular nodules and mosaic pattern)
Areas of decreased attenuation represent a mosaic pattern secondary to air-trapping ^a , corresponding to areas of bronchiolitis	Emphysema, alone or in combination with other features of chronic HP possible ^b
Head-cheese sign (a combination of ground-glass opacities, mosaic pattern and normal lung tissue) ^c	Thin-walled pulmonary cysts, few and not dominant (may also occur in patients with chronic non-fibrotic HP)
Distribution	
Mostly diffuse, usually bilateral, sometimes patchy and predominantly in the lower lung areas	Mostly lower lung zone predominance, sometimes diffuse or in mid-to-upper lung zones, with a subpleural and peribronchovascular distribution; usually bilateral, with relative sparing of the lower lung zones

Headcheese sign



- Red arrows: lobules of low attenuation lung reflecting air trapping
- Blue arrows: normal lung
- Yellow arrows: areas of ground-glass opacity.





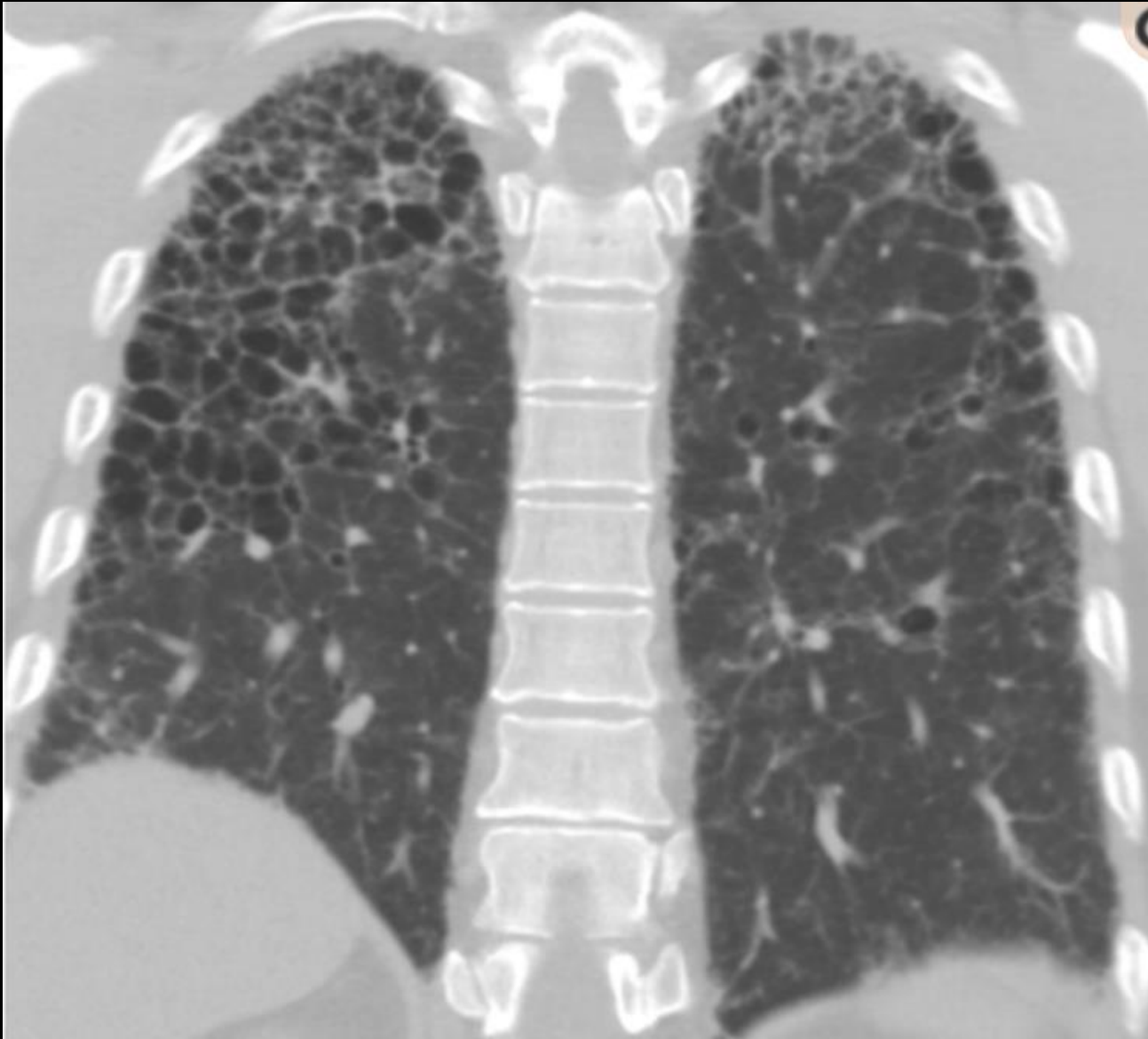
ground-glass attenuation

nodules in lung parenchyma



Inspiratory phase vs expiratory phase imaging demonstrating superimposed air trapping.⁷

Chronic HP



Upper lung zone-predominant reticular fibrosis, subpleural honeycombing and traction bronchiectasis.⁸

Wrap Up

- Hypersensitivity pneumonitis is a diffuse parenchymal lung disease caused by sensitivity to an inhaled antigen (microbial, avian, and animal).
- HRCT is the imaging modality of choice for examination in patients with reasonable suspicion for interstitial lung disease based on exposure history, clinical presentation.³
- The characteristic features of nonfibrotic HP are centrilobular ground-glass or nodular opacities with a mosaic attenuation pattern. Fibrotic HP is characterized by the presence of coarse reticulation with lung distortion, bronchiectasis and honeycombing.³

References

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